

Michigan Department of Natural Resources, Forest, Mineral & Fire Management Division

**HIGH CONSERVATION VALUE AREA (HCVA) AND ECOLOGICAL REFERENCE AREA (ERA)  
MANAGEMENT AND MONITORING FORMS PACKET**

Portions of this information are exempt from Michigan's Freedom of Information Act, 1976 PA 442, MCL 15.243



**BACKGROUND AND INSTRUCTIONS**

Prior to using this packet material and forms please refer to Work Instruction 1.4 Biodiversity Management on State Forestlands and the Conservation Area Management Guidelines available on line at:

[http://www.michigan.gov/dnr/0,1607,7-153-30301\\_33360-144865--,00.html](http://www.michigan.gov/dnr/0,1607,7-153-30301_33360-144865--,00.html).

Identified HCVAs and ERAs will be managed to conserve, protect, maintain, and/or enhance their defined conservation objectives or values. The management methods used will vary depending on the objective and type of designation. On DNR-managed lands, Ecological Reference Areas may be protected through a variety of mechanisms (refer to Conservation Area Management Guidance). Management activities or prescriptions in Ecological Reference Areas are highly restricted to those that maintain or enhance the defined attributes and values and protect the immediate natural resource values or human health and safety.

This packet is for each High Conservation Value Area (HCVA) without an existing management plan and all Legally Dedicated State Natural Areas, Ecological Reference Areas (ERA), Critical Dunes and Coastal Environmental Areas on state forest land. Its purpose is to: 1.) document baseline information on each area and its conservation values, threats, management goals and objectives, and 2.) to track changes in threats, when management activities are carried out, monitor if they are effective, and capture needed changes in management determined not to be effective.

Keep the original copies of these forms in the Compartment/Stand File within each FMU and send copies to respective DEQ and DNR program managers and the DNR, FMFM Forest Resource Management Section, Monitoring Specialist.

**SUMMARY: LOCATION MAP, MANAGEMENT RECOMMENDATIONS**

**PART I: HCVA BASELINE INFORMATION , GOALS AND OBJECTIVES**

☒ COMPLETE FOR EACH HCVA WITHOUT AN EXISTING MANAGEMENT PLAN

☒ PART I TO ACCOMPANY PART II

**SECTION 1: SITE INFORMATION**

- A. HCVA TYPE
- B. SITE ,CONTACT AND ADMINISTRATIVE INFORMATION
- C. OWNERSHIP INFORMATION
- D. CONSERVATION PARTNERS
- E. OTHER DOCUMENTS RELATED TO THIS HCVA

**SECTION 2: CONSERVATION VALUES (TARGETS)**

- A. BIODIVERSITY VALUES
- B. SOCIAL/ECONOMIC VALUES
- C. INFRASTRUCTURE/FACILITIES VALUES

**SECTION 3: CURRENT CONDITIONS (THREATS)**

- A. VALUE OR TARGET VIABILITY (POOR, FAIR, GOOD, VERY GOOD)
- B. CURRENT PRIMARY THREATS

**SECTION 4: MANAGEMENT GOALS AND OBJECTIVES**

**PART II: HCVA MONITORING**

**SECTION 5: COMPLIANCE MONITORING (WERE TASKS COMPLETED?)**

**SECTION 6: EFFECTIVENESS MONITORING AND RECOMMENDATIONS (HOW WELL DID MANAGEMENT WORK OR WERE OBJECTIVES ACHIEVED? WHAT ARE NEXT THE STEPS?)**

**SECTION 7: THREATS MONITORING FIELD FORM – STAND ALONE FORM (WHAT IS THE STATUS OF VALUES OR TARGETS?)**

☐ MAY BE COMPLETED BY ANYONE FOR ANY HCVA

☐ OR PART OF MONITORING PACKET TO ACCOMPANY PART I AND PARTS II, SECTIONS 6, 7 AND PART III.

Helpful References:

Marqoluis, R. and N. Salafsky. 1998. Measures of Success. Island Press, Washington, DC.362 pp.

The Nature Conservancy. 2005. CAP (Conservation Action Planning) Toolkit - version 08-23-05.

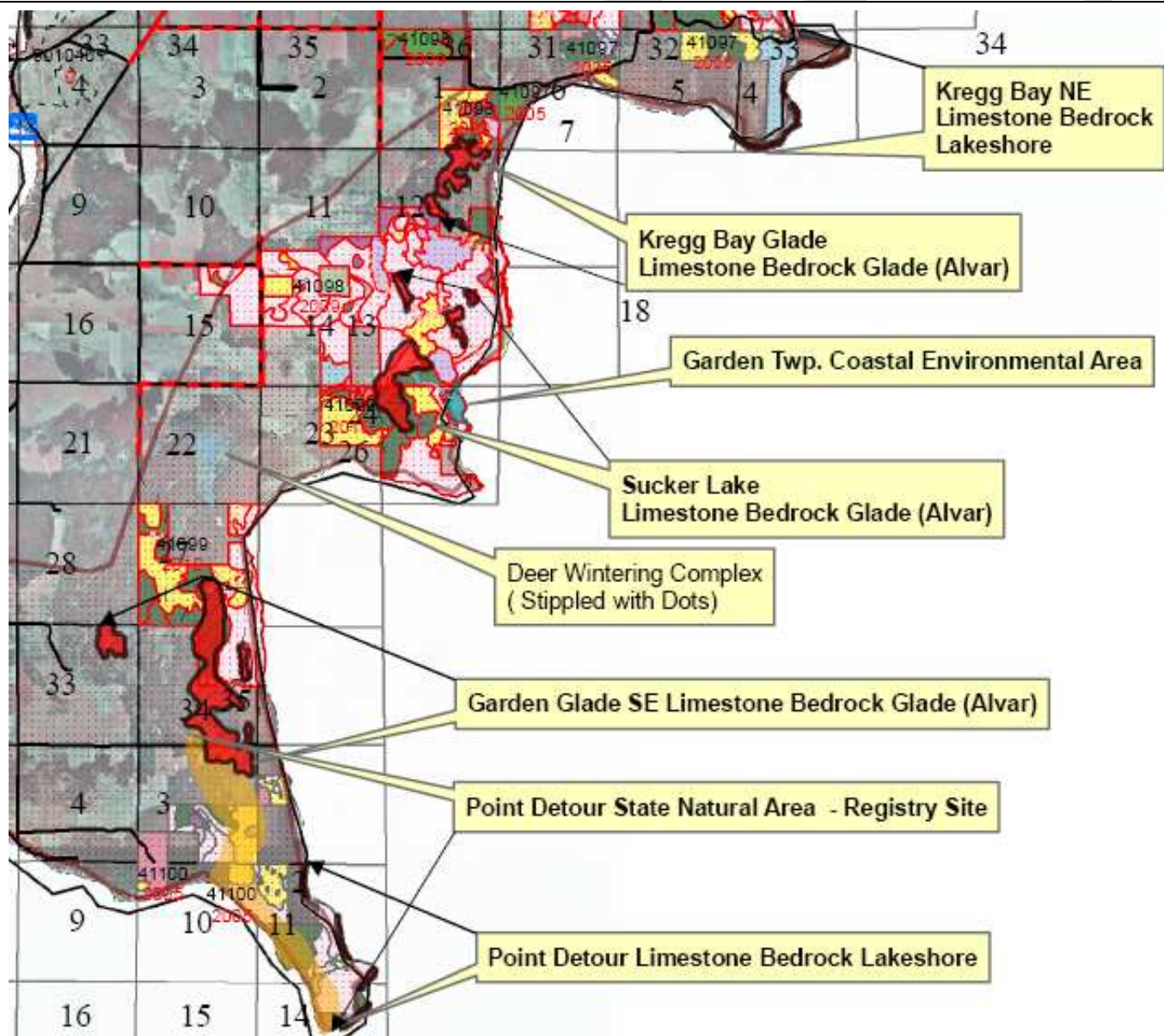
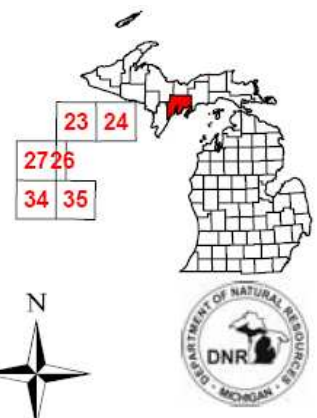
See 2007 overview at <http://sites-conserveonline.org/dcs/projects/art10152.html> and the workbook at [http://www.conserveonline.org/2003/07/s/ConPriMgmt\\_v4](http://www.conserveonline.org/2003/07/s/ConPriMgmt_v4)

## SUMMARY

**Garden Glades &  
Limestone Bedrock  
Shoreline Complex  
Ecological Reference,  
Coastal Environmental Areas &  
State Natural Area**  
Shingleton Forest Management Unit  
Delta County, Michigan  
Compartments 97, 98, 99, 100 & Private Lands  
T38N, R18W, Sec. 4, 18  
T38N, R19W, Sec. 23, 24, 26, 27, 34, 35  
T37N, R19W, Sec. 2, 3, 10, 11, 14  
Acres @ 1,844



Sucker Lake Glade Photo by Michael Kost



## RECOMMENDED MANAGEMENT GOALS AND ACTIVITIES (REPEATED FROM SECTION 4 AT BACK)

### CHECK ALL GOAL CATEGORIES THAT APPLY

- ☒ NATURAL COMMUNITY MAINTENANCE OR ENHANCEMENT GOALS
- ☒ ECOLOGICAL SYSTEMS MAINTENANCE OR ENHANCEMENT GOALS
- ☒ SPECIES MAINTENANCE OR ENHANCEMENT GOALS
- ☐ SPECIES RESTORATION GOALS
- ☐ SOCIAL ECONOMIC GOALS
- ☐ INFRASTRUCTURE/FACILITIES GOALS
- ☒ ADMINISTRATIVE GOALS— PROTECTION STATUS; CAPACITY BUILDING; FUNDING, VOLUNTEERS

**Goal 1: Maintain glades and lakeshores and associated rare species by allowing natural process to occur when compatible with ERA and management goals.**

**Objective 1: Follow FMFM Policy and Procedure 572 for wildfire suppression in the ERA's and Pt. Detour State Natural Area.**

**Task 1:** As time and resources become available, Unit staff to work with Resource Protection Specialist to develop wildfire response plan, use Minimum Impact Suppression Techniques (MIST).

**Task 2:** Consider prescribed fire as a potential management tool for restoration purposes in glades.

**Objective 2: At the District and Statewide levels, develop a control plan for invasive species and work with conservation groups to implement.**

**Task 1:** As time and resources become available, locate and remove glossy buckthorn known from Sucker Lake ERA.

**Objective 3: Monitor for illegal ATV use and enforce land use rules as needed. (Restrict vehicle access to the existing road system.) (Follow DNR Work Instruction 7.2)**

[http://www.michigan.gov/documents/7\\_133228\\_7.2.pdf](http://www.michigan.gov/documents/7_133228_7.2.pdf)

**Task 1:** Continue to report illegal blinds and uses to Law Enforcement Division

**Task 2:** Forest Resource Management Section Specialist is to Inform LED of the sensitivity to the sites.

**Task 3:** Stand examiners will consider proposing road closures as part of the normal inventory process. Road closure proposals must consider damage resulting from ORVs and other forest users bypassing the road closure.

**Objective 4: Protect and maintain known populations of listed species, in particular dwarf lake iris.**

**Task 1:** Maintain habitat by following Work Instruction 7.2 and report illegal ORV use to law enforcement.

**Objective 5: At the Eco-regional level, determine if adjacent stands to ERA would reasonably fit into an SCA category recognizing this a Biodiversity/Limestone Bedrock (Alvar) landscape complex.**

**Task 1:** Consider the ERA Complex for inclusion as a Biodiversity Stewardship Area in biodiversity and eco-regional planning process.

**Objective 6: Continue current wildlife management practices of responding to high deer density in the Garden Peninsula.**

**Task 1:** Antlerless permits are available on public and private land.

**Task 2:** Wildlife Division continue to issue crop damage permits and deer management assistance permits.

**Goal 2: Enhance protection for the Garden Glade Limestone Bedrock Lakeshore ERA complex (see map).**

**Objective 1: Support opportunities to secure mineral rights on private land.**

**Objective 2: Support opportunities for acquisition and/or work with conservation groups to acquire conservation easements on private land at District and Statewide levels.**

**Objective 3: At the District and Statewide Levels, consider working with Parks and Recreation Bureau, Fisheries Division and MDOT to develop interpretive information about the Wooded Dune and Swale complex and associated ERA's in the Garden Peninsula. (Opportunities exist at Fayette and Indian Lake State Parks, MDOT Roadside Park on US-2 and Thompson Hatchery)**

**PART I: HCVA BASELINE INFORMATION , GOALS AND OBJECTIVES**

**SECTION 1: SITE INFORMATION**

**A: HCVA TYPE – CHECK ALL THAT APPLY**

<input type="checkbox"/> Critical Dune as defined by DEQ <input type="checkbox"/> Legally Dedicated State Natural Area <input checked="" type="checkbox"/> Ecological Reference Area: per MNFI data <b>3 Limestone Bedrock Glades (Alvar Glade)</b> Kregg Bay Glade Sucker Lake Glade South East Garden Glade <b>2 Limestone Bedrock Lakeshores</b> Kregg Bay Northeast Point Detour <input type="checkbox"/> Endangered Species Management Area <input type="checkbox"/> Kirtland Warbler <input type="checkbox"/> Piping Plover <input type="checkbox"/> Other:	<input checked="" type="checkbox"/> Coastal Environmental Area as defined by DEQ: <b>Garden Twp. Coastal Environmental Area</b> <input type="checkbox"/> State Natural or Scenic River <input type="checkbox"/> Quiet Area: <input type="checkbox"/> Other:
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**ADDITIONAL SPECIAL CONSERVATION AREAS - LIST OTHER CATEGORIES BELOW**

**SCA – Wintering Deer Complex**  
**SCA – Point Detour State Natural Area - Administrative Designation – TNC Registry Agreement**  
**Lake Michigan Shoreline Management Area within EUP State Forest Plan**

**B: SITE, CONTACT AND ADMINISTRATIVE INFORMATION**

Site Name : <b>Garden Glad Alvar and Shoreline Complex</b>		Other Names	
Report Date <b>Draft November 24, 2008</b>	Forest Mgt Unit <b>Shingleton Forest Management Unit</b>	Compartment /Stand Number(s): <b>(SEE MAP)</b> <b>2005 Cmpt 97 Stand 7</b> <b>2005 Cmpt 100</b> Stands, 3, 6, 11, 14, 15, 16, 17, 18, 20, 22, 23, 27, 35, 36, 45, 24, 25 <b>2009 Cmpt 98</b> Stands 7, 9, 38, 43, 45, 46, 50, 51, 52, 53, 54 56, 65, 467 <b>2010 Cmpt 99</b> Stands, 12, 16, 18	<input checked="" type="checkbox"/> Map Attached <input type="checkbox"/> Shape File in OI/IFMAP GDSE File Location/Name
County(ies) <b>Delta</b>		Township(s) Range(s) Section(s) ¼ Sec. Optional if mapped <b>T38N, R18W, Sec. 4, 18</b> <b>T38N, R19W, Sec. 23, 24, 26, 27, 34, 35</b> <b>T37N, R19W, Sec. 2, 3, 10, 11, 14</b>	
Name of individual completing this form (first and last) <input checked="" type="checkbox"/> Check if DNR Employee <b>Kim Herman, Monitoring Specialist, Forest, Mineral, Fire Management Division (FMFMD), Escanaba</b> <b>Adam Petrelus, Forester, FMFMD, Manistique</b> <b>Robert Burnham, Forester, FMFMD, Manistique</b> <b>David Jentoft , Wildlife Technician, Wildlife Division</b> <b>Darren Kramer, Fisheries Biologist, Fisheries Division, Gladstone</b>		Telephone <b>(906) 786-2351</b>  <b>(906) 341-8643</b> <b>(906) 341-8643</b> <b>(906) 452-6236</b> <b>(906) 786-2351 ext 128</b>	Email Address <b>hermank@michigan.gov</b>  <b>petrelia@michigan.gov</b> <b>burnharg@michigan.gov</b> <b>jentoftd@michigan.gov</b> <b>kramerd@michigan.gov</b>
Additional contact information Name of individual providing information (first and last), if applicable <b>Jeff Stampfly, FMU Manager, FMFM , Shingleton</b> <b>Sherry MacKinnon, Wildlife Ecologist, Newberry</b> <b>Richard Stevenson, Acting Inventory &amp; Planning Specialist, Newberry</b>		Telephone <b>(906) 452-6227 ext 240</b> <b>(906) 293-3293 ext 4080</b> <b>(906) 293-3293 ext 4043</b>	Email Address <b>stampflg@michigan.gov</b> <b>mackinsm@michigan.gov</b> <b>stevernd@michigan.gov</b>
Name of DNR/DEQ Program Contact if Applicable <b>Brian Smolinsky</b>		Telephone <b>(906) 346-8562</b>	Email Address <b>SmolinskiM@michigan.gov</b>
<input type="checkbox"/> Volunteer (s) Number of Volunteers: Name of Group: Contact Name:		Telephone (       )	Email Address

**C: OWNERSHIP INFORMATION - CHECK ALL THAT APPLY AND INCLUDE NAME OF THE UNIT:**

- ☒ State Forest Land:  
**Shingleton Forest Management Unit**
- ☐ State Game Area:
- ☐ State Park/Recreation Area:
- ☒ Other or Private Land (describe): **Various owners**

**D: CONSERVATION PARTNERS – FILL IN ALL KNOWN PARTNERS**

Name of Organization: <b>The Nature Conservancy</b>	Name of Organization: <b>Michigan Natural Areas Council</b>
Contact Name: <b>Christine (Tina) Hall</b>	Contact Name: <b>Phyllis Higman</b>
Email Address: <b>chall@tnc.org</b>	Email Address: <b>mnac@cyberspace.org</b>
Telephone (906) 225-0399 ext 12	Telephone ( )

**E: OTHER DOCUMENTS RELATED TO THIS HCVA – CITATION AND LOCATION WHERE STORED**

Albert, Dennis A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 250 pp

Albert, D.A. 2007. Natural community abstract for limestone bedrock glade. Michigan Natural Features Inventory, Lansing, MI. 7 pp. [http://web4.msue.msu.edu/mnfi/abstracts/ecology/Limestone\\_bedrock\\_glade.pdf](http://web4.msue.msu.edu/mnfi/abstracts/ecology/Limestone_bedrock_glade.pdf)

Cohen, J.G., B.S. Slaughter, and M.A. Kost. 2008. Natural Community Surveys of Potential Ecological Reference Areas on State Forest Lands. Michigan Natural Features Inventory, Report Number 2008-04, Lansing, MI. 272 pp.

Comer, P.J., D.L. Cuthrell, D.A. Albert, and M.R. Penskar. 1997. Natural community abstract for limestone bedrock lakeshore. Michigan Natural Features Inventory, Lansing, MI. 3 pp. [http://web4.msue.msu.edu/mnfi/abstracts/ecology/Limestone\\_bedrock\\_lakeshore.pdf](http://web4.msue.msu.edu/mnfi/abstracts/ecology/Limestone_bedrock_lakeshore.pdf)

Crispin, S. 1984. Point Detour Site Ecological Summary. Michigan Natural Features Inventory, Lansing, MI. (Located in the State Natural Area Program files, Wildlife Division, Lansing)

Kost, M.A., D.A. Albert, J.G. Cohen, B.S. Slaughter, R.K. Schillo, C.R. Weber, and K.A. Chapman. 2007. Natural Communities of Michigan: Classification and Description. Michigan Natural Features Inventory, Report No. 2007-21, Lansing, MI. [Limestone Bedrock Glade](#), [Limestone Bedrock Lakeshore](#)

Petrelus, A. and T. Burnis. 2008. Shingleton Forest Management Unit Compartment Review Presentation for # Compartment 99 2010 YOE. Michigan Department of Natural Resources, Lansing, MI. 12 pp including maps.

**SECTION 2: CONSERVATION VALUES/TARGETS - CHECK ALL THAT APPLY**

**A: BIODIVERSITY VALUES**

There are a number of ways to describe biodiversity values - check all that apply.

1. **Natural Communities** – Based on Michigan Natural Features Inventory Community Classification.

GO to: [http://web4.msue.msu.edu/mnfi/data/MNFI\\_Natural\\_Communities.pdf](http://web4.msue.msu.edu/mnfi/data/MNFI_Natural_Communities.pdf); <http://web4.msue.msu.edu/mnfi/pub/abstracts.cfm>

Quality Rank comes from specific MNFI Element Occurrence Records (EOR) in the FMFM IFMAP Biodiversity Data Layer.

Community Name	State Rank	Global Rank	Quality Rank A,B,C,D
Limestone Bedrock Glade (Alvar Glade)	S2	G3	Garden Glade SE Sucker Lake AB
Limestone Bedrock Glade (Alvar Glade)	S2	G3	Kregg Bay B
Limestone Bedrock Lakeshore	S2	G3	Point Detour A
Limestone Bedrock Lakeshore	S2	G3	Kregg Bay Northeast B

2. **Other information if known.**

☒ **Ecological Systems** .Check Applicable Regional Landscape Ecosystem (Section), Subsection, and Sub-subsection from Albert, Dennis A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 250 pp

Name	Section Number	Subsection Number	Sub-subsection Number
Section VIII. Northern Lacustrine-Influenced Upper Michigan and Wisconsin	8		
Subsection VIII.1. Niagaran Escarpment and Lake Plain	8	1	
Sub-subsection VIII.1.3. Escanaba Door Peninsula	8	1	8.1.3.

### 3. Ecological Systems

☒ **List name(s) of Ecosystems/Natural Communities (based on MNFI Community Classification):**

**LIMESTONE BEDROCK GLADE OVERVIEW** Excerpted from Cohen et al 2008: Limestone bedrock glade consists of an herb- and graminoid-dominated plant community with scattered clumps of stunted trees and shrubs growing on thin soil over limestone or dolomite. Tree cover is typically 10 to 25%, but occasionally as high as 60%. Shrub and herb cover is variable and there are typically areas of exposed bedrock. Mosses, lichens, and algae can be abundant on the exposed limestone bedrock or thin organic soils. Seasonal flooding and summer drought maintain the open conditions. In Michigan, limestone bedrock glade occurs in the Upper Peninsula near the shorelines of Lakes Huron and Michigan, concentrated in a band from Drummond Island to Cedarville and from Gould City to the Garden Peninsula. In the Northern Lower Peninsula, limestone bedrock glade occurs along the Lake Huron shoreline near Rogers City, Alpena, and Thompson's Harbor. This community is also referred to as alvar glade.

 <p>State Distribution</p>		
<p>Limestone Bedrock Glade Statewide Distribution From Albert, 2007.</p>	<p>Garden Glade Southeast  Photo by Adrienne L. Bozic</p>	<p>Kregg Bay Glade  Photo by Bradford Slaughter</p>

#### Summary Site Descriptions excerpted from Cohen 2008.

##### Sucker Lake

Natural Community Type: Limestone Bedrock Glade  
(Alvar Glade)

Rank: G3 S2, globally vulnerable and critically imperiled in the state

Element Occurrence Rank: AB

Location: Shingleton Forest Management Unit,  
Compartments 98 and 99, and Private Lands

Element Occurrence Identification Number: 142

Acres: 128.3 (126.6 State + 1.7 Private)



**Site Description:** This limestone bedrock glade is located a half mile from the shoreline on the Garden Peninsula and is surrounded by aspen forest and rich conifer swamp. The alvar glade is characterized by thin (2-10 cm) calcareous (pH 8.0) sandy to clay loam soils over limestone bedrock with almost no areas of bedrock exposure. The limestone bedrock glade is dominated by a scattered canopy of white spruce (*Picea glauca*), northern whitecedar (*Thuja occidentalis*), paper birch (*Betula papyrifera*), and quaking aspen (*Populus tremuloides*). These tree species are also found in the surrounding boreal forest with occasional white pine (*Pinus strobus*) (20- 40 cm dbh). The scattered shrub layer of the limestone bedrock glade is characterized by common juniper (*Juniperus communis*) and soapberry (*Shepherdia canadensis*) and the ground layer is dominated by ebony sedge (*Carex eburnea*), poverty grass (*Danthonia spicata*), dwarf lake iris (*Iris lacustris*, state threatened), and Richardson's sedge (*Carex richardsonii*, state special concern). Over 70 vascular plants were documented during the survey.

**Garden Glade Southeast****Natural Community Type:** Limestone Bedrock Glade (Alvar Glade)**Rank:** G3 S2, globally vulnerable and critically imperiled in the state**Element Occurrence Rank:** AB**Location:** Shingleton Forest Management Unit, Compartment 99, and Private Lands**Element Occurrence Identification Number:** 9612**Acres:** 277 (103.1 State + 173.8 Private)

**Site Description:** This extensive limestone bedrock glade occurs over limestone pavement paralleling the shoreline on a gentle eastern slope a quarter of a mile from Lake Michigan. Closed-canopy boreal forest of quaking aspen (*Populus tremuloides*), white spruce (*Picea glauca*), and balsam fir (*Abies balsamea*) surround the glade. The site is characterized by thin (0-15 cm) alkaline (pH 8.0) organic and loam soils over limestone pavement. Exposed limestone slabs occur occasionally.

This alvar glade exhibits structural complexity, grading from sparse vegetation zones to grassland to glade to woodland. In addition, the glade has several seasonally wet pockets. During July surveys, the glade was dry and droughty but pockets of wetland plants indicated spring saturation. In areas of exposed bedrock, vegetation is sparse except for in cracks in the limestone where sufficient soil has developed to support plant growth. In other areas, several centimeters of loam or organic soils support a tree canopy of scattered northern white-cedar (*Thuja occidentalis*). Additional canopy associates include white spruce, aspens (*Populus* spp.), and white pine (*Pinus strobus*). Distribution of northern white-cedars is very clumpy, and a distinct browse line is visible on the trees and shrubs. Scattered clumps of common juniper (*Juniperus communis*) occur in the low shrub layer and the ground layer is dominated by poverty oats (*Danthonia spicata*) in drier areas and dwarf lake iris (*Iris lacustris*, state threatened) is prevalent in moister areas. In addition to the rare dwarf lake iris, Richardson's sedge (*Carex richardsonii*, state special concern) and beauty sedge (*Carex concinna*, state special concern) are known from the alvar glade.




**Kregg Bay Glade****Natural Community Type:** Limestone Bedrock Glade (Alvar Glade)**Rank:** G3 S2, globally vulnerable and critically imperiled in the state**Element Occurrence Rank:** B**Location:** Shingleton Forest Management Unit, Compartment 98, and Private Lands**Element Occurrence Identification Number:** 5952**Acres:** 70.5 (7.3 State + 63.2 Private)

**Site Description:** Kregg Bay Glade is a sinuous limestone bedrock glade located less than half a mile from the shoreline surrounded by second growth boreal forest of white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), and northern white-cedar (*Thuja occidentalis*), and aspen clearcuts. The soils are thin (0-14 cm) loamy alkaline sands and organics over limestone bedrock with local exposures of bedrock. The alvar glade is characterized by a scattered to clumped canopy (20-50% cover) of white spruce (10-30 cm dbh) and northern white-cedar (20-40 cm dbh) with sparse balsam fir, white pine (*Pinus strobus*), red pine (*P. resinosa*), and trembling aspen (*Populus tremuloides*). The open subcanopy and tall shrub layer (10-40% cover) is dominated by white spruce with occasional choke cherry (*Prunus virginiana*). Scattered low shrubs include soapberry (*Shepherdia canadensis*), ground juniper (*Juniperus communis*), and alder-leaved buckthorn (*Rhamnus alnifolia*). White spruce also occurs in the low shrub layer. The ground layer is characterized by ebony sedge (*Carex eburnea*), poverty grass (*Danthonia spicata*), dwarf lake iris (*Iris lacustris*, state threatened), and Richardson's sedge (*Carex richardsonii*, state special concern). Fifty-seven vascular plants were documented during the survey.

**LIMESTONE BEDROCK LAKESHORE OVERVIEW *Excerpted from Cohen et al 2008***

**Overview:** Limestone bedrock lakeshore is a sparsely-vegetated community dominated by herbaceous vegetation, mosses, and lichens, with stunted trees and shrubs often concentrated above the strong influence of waves and ice scour, and on cobble ridges. This community, which is also referred to as alvar pavement and limestone pavement lakeshore, occurs along the shorelines of northern Lake Michigan and Lake Huron on broad, flat, horizontally-bedded expanses of limestone or dolomite bedrock. The soil is mostly organic and the pH is slightly acid to neutral. Three structure or dominance zones are typically present: splash zone of the lowest wave and ice swept portion; lichen-herb zone in the middle portion, splashed by spray during storms, dominated by crustose lichens with patches of herbs and occasional shrubs; and a heath zone of the upper portion, swept by winds, subject to rime accumulation, and dominated by stunted conifer trees or low evergreen shrubs.

Bedrock lakeshore is characterized by stressed and unstable environment because of winter ice, storms, and wind. On the Lake Michigan shoreline, limestone bedrock lakeshore is concentrated along the Garden Peninsula and the southern part of Schoolcraft County. Along Lake Huron, it is located on Drummond Island, east of the Les Cheneaux Islands, and on Thunder Bay Island.

 <p>State Distribution</p>		
<p>Limestone Bedrock Shore State Distribution From Comer et al 1997</p>	<p>Kregg Bay NE Limestone Bedrock Lakeshore Photo by Rebecca K. Schillo</p>	<p>Point Detour Limestone Bedrock Lakeshore Photo by Michael A. Kost</p>

#### Summary Site Descriptions Excerpted from Cohen et al 2008

##### Kregg Bay Northeast

Natural Community Type: Limestone Bedrock Lakeshore

Rank: G3 S2, very rare globally, imperiled in the state

Element Occurrence Rank: B

Location: Shingleton Forest Management Unit, Compartment 97, and Private Lands

Element Occurrence Identification Number: 1924

Acres: 23.4 (4.6 State + 18.8 Private)

**Site Description:** Limestone bedrock lakeshore extends for just under a mile along the shoreline of northern Lake Michigan. Three distinct stretches of bedrock lakeshore occur and are separated by limestone cobble shore and backed by a high cobble ridge. The exposed, flat to gently sloping limestone bedrock pavement has sparse calcareous soils. Soil development is concentrated in grykes and holes in the bedrock and soils are approximately 1 to 5 cm deep and are alkaline (pH 8.0) sands with a high organic content. Wave action and ice-scrape limit vegetation development near the shoreline; vegetation development and maturity increase with distance from the lake. Patches of dense vegetation are interspersed with flat open bedrock and occasional one to two meter limestone shelves and open water pools. The upland adjacent to the limestone bedrock lakeshore is boreal forest of dense white spruce (*Picea glauca*), northern white-cedar (*Thuja occidentalis*), balsam fir (*Abies balsamea*), and aspens (*Populus* spp.).

Vegetation is confined primarily to cracks in the flat bedrock pavement. Dominant vegetation includes silverweed (*Potentilla anserina*), common water horehound (*Lycopus americanus*), harebell (*Campanula rotundifolia*), low calamint (*Calamintha arkansana*), hair grass (*Deschampsia cespitosa*), dwarf lake iris (*Iris lacustris*, state threatened), smooth aster (*Aster laevis*), balsam ragwort (*Senecio pauperculus*), and small, shrubsized balsam poplar (*Populus balsamifera*). Sporadic dense patches of vegetation with Baltic rush (*Juncus balticus*), silverweed, sedges (*Carex* spp.), and blue wild rye (*Elymus glaucus*) are confined to areas where soil development has occurred further from the lakeshore.

##### Point Detour

Natural Community Type: Limestone Bedrock Lakeshore

Rank: G3 S2, very rare globally, imperiled in the state

Element Occurrence Rank: A

Location: Shingleton Forest Management Unit, Compartment 100, and Private Lands

Element Occurrence Identification Number: 10606

Acres: 24.4 (16.9 State + 7.4 Private)

**Site Description:** The site is characterized by a mile-long stretch of limestone bedrock shore along the northern Lake Michigan shoreline that varies in width from 16 to 100 m. The shoreline, which is primarily limestone bedrock lakeshore with stretches of limestone cobble shore, small limestone ledges, and open water pools, is backed by a one to five meter high cobble ridge and dense boreal forest. The limestone bedrock lakeshore is sparsely vegetated with patchy vegetation concentrated in the cracks within the bedrock. Soils are thin (3-10 cm) and alkaline (pH 8.0) with high organic content mainly confined to grykes (cracks) and holes in the limestone pavement. Characteristic species along the limestone bedrock lakeshore include balsam poplar (*Populus balsamifera*) seedlings, shrubby cinquefoil (*Potentilla fruticosa*), silverweed (*P. anserina*), grass-leaved goldenrod (*Euthamia graminifolia*), Kalm's St. John's-wort (*Hypericum kalmianum*), beak-rush (*Rhynchospora capitellata*), goldenseeded spike-rush (*Eleocharis elliptica*), Baltic rush (*Juncus balticus*), Ohio goldenrod (*Solidago ohioensis*), common water horehound (*Lycopus americanus*), harebell (*Campanula rotundifolia*), low calamint (*Calamintha arkansana*), and sedges (*Carex* spp.). A small limestone bedrock glade occurs at the southern and inland edge of the shoreline with white spruce (*Picea glauca*), northern white-cedar (*Thuja occidentalis*), and dwarf lake iris (*Iris lacustris*, state threatened).

☒ **Ecological processes** – such as connectivity, hydrology, fire, wind events, flooding, pest and disease cycles;

**Describe:** Seasonal flooding and summer drought maintain the open conditions in the Limestone Bedrock Glade (alvar) community. Shoreline processes (winter ice, storms, and wind) maintain the Limestone Bedrock Lakeshore, see excerpts below.

**Limestone Bedrock Glade (alvar)** *Excerpted from Kost et al 2007.* The combination of flooded conditions in the spring and fall, with droughty conditions during the summer, maintains open conditions where trees are scattered and stunted. Seasonal flooding is less prevalent where there are abundant cracks in the rock, which provide improved internal drainage. However, sites with internal drainage are more prone to early desiccation and drought. Lightning fires may occasionally burn these sites, and there is speculation that Native Americans were responsible for some fires into the mid- to late nineteenth century. Strong winds off the Great Lakes result in windthrow of mature trees, which are shallowly rooted in the thin soils. Browsing by ungulates influences woody species composition and structure.

**Limestone Bedrock Lakeshore:** *Excerpted from Kost et al 2007.* Storms, wind, winter ice scour, fluctuating water levels, and severe desiccation produce a stressful, unstable environment for vegetation establishment and growth. During storms, flooding, pounding waves, and high winds rearrange large boulders, smaller rocks, and fine sediments, eliminating local pockets of vegetation and creating new habitat patches for plant establishment. Winter ice scour scrapes clean smooth areas of bedrock and deposits fresh loads of boulders, cobble, and sediments as the ice and snow melt. Thin soils, full exposure, and high winds combine to produce severely desiccating conditions, especially during summer dry periods. Changes in Great Lakes water levels result in vegetation colonizing recently exposed shorelines during periods of low water only to be submerged and often eliminated during periods of high water. Windthrow is common along the upland margin, where trees are able to mature but are shallowly rooted in the thin soils overlying the bedrock.

☒ **Underlying environmental features** – such as soils, geology, topography, headwaters;

**Describe:** The topography within the compartment is mostly flat. Slight elevation changes occur with values ranging from 581-650 feet. The majority of the compartment is dominated by mixed stands of aspen, birch, and balsam fir. Stands bordering the Lake Michigan shoreline are mostly cedar. The major soil types found, in order of abundance, are Limestone Rock Land, Summerville, and Eastport. Additional soils found are Alpena, Ensign, Duel, Rubicon, and Ruse. Habitat types within the compartment, in order of abundance, are Unclassified (Limestone Rock Land), PARVAa, AFOA, PVE, Unclassified Lowland, and ATFD. It lies within the Garden Outcrop Land Type Association, and the Lake Michigan Shoreline Management Area. (From Petrelus and Burnis, 2008)

☒ **Environmental gradients** – such as elevation, precipitation, temperature;

**Describe:** The topography is mostly flat. Slight elevation changes occur with values ranging from 581-650 feet.

☒ **Species and/or community structure** – using during migration, during different life stages, or gradual species turnover across environmental gradients.

**Describe:**

☒ **Nested large and small natural communities linked by functional or restorable ecosystems:**

**Describe:** Sucker Lake, a small (8.3 acres) and shallow lake, is in Compartment 99. Previous surveys documented a fish community of common shiner, bluntnose minnow, Iowa darter, finescale dace, golden shiner, longnose dace, rock bass, and suckers. Suckers also use Sucker Lake and its connecting streams for spawning. Mud Lake is another small lake also found within this compartment, but no information exists in the files regarding this waterbody.

Great Lakes Garden Twp. Coastal Environmental Area: Fisheries values include spawning for native fish species in part due to its connection to Sucker Lake.

☒ **High quality natural communities nearby:**

**Describe:** High quality Portage Bay Wooded Dune and Swale complex to the north.

☐ **Large Block Size:**

**General Shape and Acres:**

**4. Species Assemblages – List types of species assemblage targets.**

☐ **Major groupings of species** - share common natural processes or have similar conservation requirements (e.g., freshwater mussels, forest-interior birds, essential pollinators).

☒ **Globally significant species aggregations (e.g. migratory shorebird aggregation).**

Near shore birds, such as Caspian and common terns, are reported by Richard Stevenson. Migratory and nesting interior birds are dependent on spring midge hatches and near shore lowland conifer forests.

**5. Species - List types of species by common and scientific name.:**

☐ **Focal species** - keystone, wide-ranging (regional), providing linkages between ecosystems, and umbrella species.

**Species:**

☒ **Globally imperiled or state endangered or threatened native species** - Ranked G1, G2, G3 by NatureServe, and S1, S2 by MNFI, state and/or federally listed or proposed for listing as Threatened (T) or Endangered (E) (MI and U.S.), and on the IUCN Red List (International).

**Species:**

The combined populations of dwarf lake iris within the Garden Glades & Limestone Bedrock Shoreline Complex constitute a “macro-reserve” for this federally and state listed threatened, great lakes shoreline endemic plant. Dwarf Lake Iris is known from all but one ERA in addition to the Detour State Natural Area, which lies largely outside of the ERA boundaries. The primary value for the Detour SNA is it’s large, contiguous population of dwarf lake iris and a rare sedge of special concern, *Carex concinna* (Crispin, 1984). Primary threats to dwarf lake iris throughout its global range in the northern great lakes are from shoreline development on private lands, making these populations important because of their location on undeveloped public lands. Within the Point Detour SNA, the northern portion of the dwarf lake iris colony probably is a relict from former Great Lakes shorelines persisting there for thousands of years. Therefore, the macro-reserve has large populations of both relict and modern shores, over many undeveloped acres. (Crispin 1984). All the rare plants and animals known from all sites collectively are in the tables below.

Scientific Name	Common Name	Habitat	US Status	State Status	Global Rank	State Rank	More Information
<i>Iris lacustris</i>	Dwarf Lake Iris 2004 – ID 2811 A Rank	Open dunes Alvar Limestone Bedrock & Cobble Lakeshores	LT	T	G3	S3	<a href="#">Summary Abstract</a>
<i>Gymnocarpium robertianum</i>	Limestone Oak Fern 1983	Rich Conifer Swamp		T	G5	S2	<a href="#">Summary Abstract</a>

Scientific Name	Common Name	Habitat	US Status	State Status	Global Rank	State Rank	More Information
<i>Tanacetum huronense</i>	Lake Huron Tansy 1981	Open dunes Limestone cobble shore		T	G5T4T5	S3	<a href="#">Summary Abstract</a>
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Nesting trees along Lake MI shoreline		T	G4	S4	<a href="#">Summary Abstract</a>

- ☒ **Species of Special Concern - Due to vulnerability, declining trends, disjunct distributions, or endemic status; Ranked S3 by MNFI**

**Species:**

Scientific Name	Common Name	Habitat	US Status	State Status	Global Rank	State Rank	More Information
<i>Carex concinna</i>	Beauty Sedge	Alvar Limestone bedrock glade Limestone bedrock lakeshore		SC	G4G5	S3	<a href="#">Summary</a>
<i>Carex richardsonii</i>	Richardson's Sedge	Alvar Limestone bedrock glade		SC	G4	S3S4	<a href="#">Summary Abstract</a>
<i>Catinella exile</i>	Land Snail	Limestone cobble shore		SC	G2	SU	<a href="#">Summary Abstract</a>
<i>Vertigo cristata</i>	Snail Crested Vertigo	Dry non-acid cliff		SC	G4	S3	<a href="#">Summary Abstract</a>
<i>Vertigo elatior</i> 1998	Snail Tapered Vertigo	Limestone cobble shore Limestone bedrock glade Limestone bedrock lakeshore		SC	G5	S3	<a href="#">Summary Abstract</a>
<i>Vertigo hubrichti</i>	Snail Hubricht's Vertigo	Limestone bedrock glade Limestone bedrock lakeshore		SC	G3	S2	<a href="#">Summary</a>

- ☐ **Other species of greatest conservation need - Identified as part of Michigan's Wildlife Action Plan due to declining populations or other characteristics that may make them vulnerable.**

**B: KNOWN SOCIAL/ECONOMIC VALUES**

- ☐ Archaeological  
☐ Historical:  
☒ Recreational:  
☒ Camping : **Dispersed camping for deer hunting primarily**  
☒ Canoeing/Kayaking: **near shore on Lake Michigan**  
☒ Fishing: **near shore on Lake Michigan**  
☐ Hiking/Backpacking:  
☒ Hunting/Trapping: **deer**  
☒ Photography: **coastal photography**  
☒ Scenic: **undeveloped Lake MI shoreline**  
☒ Water (lake, river, stream): **Lake Michigan, Sucker Lake, Mud Lake**  
☒ Wildlife Viewing:  
☐ Cross Country Skiing  
☐ Other :  
☒ Restorative/Spiritual: **due to scenic shoreline**  
☒ Traditional Use/Gathering: **fall deer hunting**

**C: EXISTING INFRASTRUCTURE/FACILITIES:**

- ☐ American Disability Accessibility (ADA) Considerations  
☐ Boat Launch(es)  
☐ Bridge(s):  
☐ Campground(s):  
☐ Interpretive Displays:  
☐ Marked boundaries  
☐ Parking lot(s):  
☐ Posted use rules  
☐ Scenic Overviews  
☐ Toilet(s)  
☐ Trails/Boardwalks:  
☒ Other: **Existing forest road to the beach connects to the e/w 10<sup>th</sup> Road (County Road). It supports 4 wheeled vehicles leading to from historic n/s forest road along Lake Michigan shoreline.**

Additional ORV traffic/use comes from Fairport along the shoreline.

**SECTION 3: CURRENT CONDITIONS**

**D. CURRENT STATUS/VIABILITY OF CONSERVATION VALUE/TARGET (FROM TNC CAP TOOL KIT)**

**STATUS DEFINITIONS – POOR - IMMINENT LOSS, FAIR – VULNERABLE, GOOD – MINIMUM INTEGRITY, VERY GOOD - OPTIMAL INTEGRITY**

<b>LIST CONSERVATION VALUE/TARGET FROM SECTION 2 – A, B OR C</b>	<b>LIST CATEGORY OF SIZE, CONDITION, OR LANDSCAPE CONTEXT</b>	<b>LIST KEY ATTRIBUTE</b>	<b>LIST INDICATOR</b>	<b>LIST CURRENT STATUS POOR, FAIR, GOOD, OR VERY GOOD</b>
LIMESTONE BEDROCK GLADES	CONDITION LANDSCAPE CONTEXT	* INTACT ECOLOGICAL PROCESSES * FLORA * RARE SPECIES – PLANT AND ANIMAL	* MAINTENANCE OF OPEN, GLADE CONDITION * LACK OF DAMAGE FROM VEHICLES (LEGAL AND ILLEGAL) * FLORISTIC QUALITY * PRESENCE OF RARE SPECIES * VOLUNTARY PROTECTION ON PRIVATE LANDS	GOOD TO VERY GOOD
LIMESTONE BEDROCK LAKESHORES	CONDITION LANDSCAPE CONTEXT	* UNDEVELOPED SHORELINE * INTACT SHORELINE PROCESSES * FLORA * RARE SPECIES - PLANT AND ANIMAL	* LACK OF DAMAGE FROM VEHICLES (LEGAL AND ILLEGAL) * FLORISTIC QUALITY * PRESENCE OF RARE SPECIES * VOLUNTARY PROTECTION ON PRIVATE LANDS	GOOD TO VERY GOOD
DWARF LAKE IRIS	SIZE CONDITION LANDSCAPE CONTEXT	* LARGE CONTIGUOUS POPULATIONS ON PUBLIC LANDS * POPULATIONS ON BOTH RELICT AND MODERN GREAT LAKE'S SHORELINES	* EXTENT OF POPULATIONS * EVIDENCE OF FLOWERING PLANTS * VOLUNTARY PROTECTION IN PLACE ON PRIVATE LANDS * PROTECTION ON STATE LANDS WITHIN ERA'S AND STATE NATURAL AREA	GOOD
SCENIC SHORELINE	SIZE AND CONDITION	SEVERAL MILES OF UNINTERRUPTED AND UNDEVELOPED SHORELINE	* VOLUNTARY PROTECTION IN PLACE FOR UNDEVELOPED SHORELINE * LACK OF DAMAGE FROM ILLEGAL ATV USE	GOOD
DEER WINTER HABITAT	SIZE, CONDITION, & LANDSCAPE CONTEXT	UPLAND AND LOWLAND CLOSED CANOPY CONIFER FOREST SURROUNDING ERA COMPLEX	BROWSE CONDITION AND CANOPY CLOSURE ON HABITAT SURROUNDING THE ERA'S	GOOD
HUNTING – DEER, BEAR, GROUSE, WOODCOCK, HARE	SIZE, CONDITION, & LANDSCAPE CONTEXT	FOREST COVER DIVERSITY	HUNTER ACTIVITY	VERY GOOD

**E. : INITIAL PRIMARY THREATS ASSESSMENT TO ESTABLISH BASELINE CONDITION**

**CHECK ALL THAT THERE IS ACTUAL EVIDENCE FOR AND DESCRIBE THE EVIDENCE BRIEFLY AND/OR ATTACH PHOTOS**

**DO THIS INITIALLY FROM AERIAL PHOTOS, LOCAL KNOWLEDGE, AND EXISTING DATA FOLLOWED BY A SITE VISIT.**

**A. Habitat Conversion & Degradation – Complete or substantial loss of or damage to natural habitats.**

- ☐ Altered Fire Regime -suppression or increase in fire frequency and/or intensity outside of its natural range of variation:
- ☐ Altered Hydrologic Regime Changing water flow patterns outside their natural range of variation (surface water diversion, groundwater pumping, dam operations)
- ☐ Commercial & Industrial Development: factories, stand-alone shopping centers, office parks, train yards, docks, ship yards, airports, landfills)
- ☐ Farms & Plantations Agricultural operations - commercial farms, industrial plantations, feed lots, aquaculture
- ☐ Housing & Urban Development Expansion of cities, towns, settlements, non-housing development - urban areas, suburbs, villages, homes, shopping areas, offices, schools, hospitals
- ☐ Military Activities Actions by formal or paramilitary forces (military bases, defoliation, munitions testing :
- ☐ Natural System Modifications Actions that convert or degrade habitat to “managing” natural systems for human welfare - dam construction, land reclamation, wetland filling, rip-rap along shoreline, levees and dikes
- ☐ Recreation Areas: Recreation sites with a substantial footprint ski areas, golf courses, resorts, county parks
- ☐ Other:

**E. : INITIAL PRIMARY THREATS ASSESSMENT TO ESTABLISH BASELINE CONDITION**  
**CHECK ALL THAT THERE IS ACTUAL EVIDENCE FOR AND DESCRIBE THE EVIDENCE BRIEFLY AND/OR ATTACH PHOTOS**  
**DO THIS INITIALLY FROM AERIAL PHOTOS, LOCAL KNOWLEDGE, AND EXISTING DATA FOLLOWED BY A SITE VISIT.**

- B. Transportation Infrastructure** – Long narrow corridors **altering, fragmenting, and disturbing** natural habitat and species, including soil erosion/sedimentation, and providing routes for invasive or problematic species.
- ☐ Flight Paths :  
☐ Railroads:  
☒ Roads and Trails: **Existing forest road to the beach connects to the e/w 10<sup>th</sup> Road (County Road). It supports 4 wheeled vehicles leading to from historic n/s forest road along Lake Michigan shoreline. Additional ORV traffic/use comes from Fairport along the shoreline.**  
☐ Shipping Lanes:  
☐ Trails:  
☐ Utility Lines.  
☒ Stream Crossings - *culverts, bridges* : **Shoreline road traffic continues through Coastal Environmental Area.**  
☐ Other:
- C. Energy & Mining** – Production of non-biological resources **having negative impacts** to conservation values.
- ☒ Mining – *Exploring, developing, and producing.* **DNR owns all minerals on state land and some on private.**  
☐ Oil & Gas Drilling  
☐ Renewable Energy – *Exploring, developing, and producing.*
- D. Biological Resource Harvesting** –Over or under consumption of “wild” resources **resulting in loss** of conservation values.
- ☐ Gathering – *Harvesting plants, fungi, and other non-timber/non-animal products for commercial, recreation, or subsistence purposes.*  
☐ Grazing  
☐ Hunting, Trapping & Fishing  
☐ Timber Harvesting:
- E. Recreation & Research** – Non-consumptive uses of biological resources **resulting in damage** to natural resources.
- ☐ Human-Powered Recreation – *mountain bikes, hikers, backpackers, cross-country skiers, rock climbers, canoeists, kayakers, hang-gliders, birdwatchers, photographers*  
☒ Motor-Powered Recreation - *Traveling outside of established transport corridors: off-road vehicles, motorcycles, motorboats, jet-skis, snowmobiles, ultra-light planes.* **Off road ATV use. See section B above.**  
☐ Scientific Research – *Ecosystem manipulations*
- F. Pollution** – Introduction of exotic and/or excess materials from point and non-point sources with **evidence of resource damage.**
- ☐ Chemicals & Toxins  
☐ Greenhouse Gasses –*CO<sub>2</sub>, methane*  
☐ Light Pollution  
☐ Noise Pollution  
☐ Nutrient Loads  
☐ Radioactive Materials  
☐ Salt/Brine  
☐ Solid Waste – *garbage, litter*  
☐ Thermal Pollution  
☐ Waste & Residual Materials – *dredge spoil, water treatment residuals, slash, mine tailings, excess sediment loads.*
- G. Invasive & Other Problematic Species & Genes** – Aquatic or terrestrial non-native and native species or genetic materials that have or are predicted to have harmful effects on biodiversity following their introduction, spread and/or increase in abundance.  
List species, extent of infestation and fill out Forest Health Form.
- ☐ Introduced Genetic Material  
☒ Invasive Species: **Several non-native species were noted during the 2006 & 2007 MNFI site surveys. Of particular concern is glossy buckthorn noted at Sucker Lake Glade. Other old-field species include Canada bluegrass, *Cirsium arvense* Canada thistle, *Cirsium palustre* Marsh thistle, *Cirsium vulgare* bull thistle, common St. John’s wort, dandelion, mullein, narrow leaved cat-tail, orange hawkweed, ox-eyed daisy, Queen Anne’s lace, red-clover, red-top *Agrostis gigantean*, spotted knapweed and timothy.**  
☒ Problematic Native Species: **Deer herbivory**  
☐ Hybrid Species
- H. Climate Change** – Evidence of impacts from long-term changes linked to global warming and other climate issues.
- ☐ Climate Variability – Intensification and/or alteration of normal weather patterns - *droughts, high wind or rain event.*  
☐ Habitat Shifting & Alteration
- I. Other**

**SECTION 4: RECOMMENDED MANAGEMENT GOALS AND ACTIVITIES**  
**LIST GOAL(S), FOR EACH VALUE, RELATED THREAT ABATEMENT, MAINTENANCE OR ENHANCEMENT NEED IDENTIFIED**  
**IN SECTIONS 2 AND 3**

**CHECK ALL GOAL CATEGORIES THAT APPLY**

- ☒ **NATURAL COMMUNITY MAINTENANCE OR ENHANCEMENT GOALS**  
☒ **ECOLOGICAL SYSTEMS MAINTENANCE OR ENHANCEMENT GOALS**  
☒ **SPECIES MAINTENANCE OR ENHANCEMENT GOALS**  
☐ **SPECIES RESTORATION GOALS**  
☐ **SOCIAL ECONOMIC GOALS**  
☐ **INFRASTRUCTURE/FACILITIES GOALS**  
☒ **ADMINISTRATIVE GOALS— PROTECTION STATUS; CAPACITY BUILDING; FUNDING, VOLUNTEERS**

**GOAL# AND DESCRIPTION FROM SECTIONS 2 AND 3**

- Goal 1: Maintain glades and lakeshores and associated rare species by allowing natural process to occur when compatible with ERA and management goals.**  
**Objective 1: Follow FMFM Policy and Procedure 572 for wildfire suppression in the ERA's and Pt. Detour State Natural Area.**  
**Task 1:** As time and resources become available, Unit staff to work with Resource Protection Specialist to develop wildfire response plan, use Minimum Impact Suppression Techniques (MIST).  
**Task 2:** Consider prescribed fire as a potential management tool for restoration purposes in glades.  
**Objective 2: At the District and Statewide levels, develop a control plan for invasive species and work with conservation groups to implement.**  
**Task 1:** As time and resources become available, locate and remove glossy buckthorn known from Sucker Lake ERA.  
**Objective 3: Monitor for illegal ATV use and enforce land use rules as needed. (Restrict vehicle access to the existing road system.) (Follow DNR Work Instruction 7.2) [http://www.michigan.gov/documents/7\\_133228\\_7.2.pdf](http://www.michigan.gov/documents/7_133228_7.2.pdf)**  
**Task 1:** Continue to report illegal blinds and uses to Law Enforcement Division  
**Task 2:** Forest Resource Management Section Specialist is to Inform LED of the sensitivity to the sites.  
**Task 3:** Stand examiners will consider proposing road closures as part of the normal inventory process. Road closure proposals must consider damage resulting from ORVs and other forest users bypassing the road closure.  
**Objective 4: Protect and maintain known populations of listed species, in particular dwarf lake iris.**  
**Task 1:** Maintain habitat by following Work Instruction 7.2 and report illegal ORV use to law enforcement.  
**Objective 5: At the Eco-regional level, determine if adjacent stands to ERA would reasonably fit into an SCA category recognizing this a Biodiversity/Limestone Bedrock (Alvar) landscape complex.**  
**Task 1:** Consider the ERA Complex for inclusion as a Biodiversity Stewardship Area in biodiversity and eco-regional planning process.  
**Objective 6: Continue current wildlife management practices of responding to high deer density in the Garden Peninsula.**  
**Task 1:** Antlerless permits are available on public and private land.  
**Task 2:** Wildlife Division continue to issue crop damage permits and deer management assistance permits.
- Goal 2: Enhance protection for the Garden Glade Limestone Bedrock Lakeshore ERA complex (see map).**  
**Objective 1: Support opportunities to secure mineral rights on private land.**  
**Objective 2: Support opportunities for acquisition and/or work with conservation groups to acquire conservation easements on private land at District and Statewide levels.**  
**Objective 3: At the District and Statewide Levels, consider working with Parks and Recreation Bureau, Fisheries Division and MDOT to develop interpretive information about the Wooded Dune and Swale complex and associated ERA's in the Garden Peninsula. (Opportunities exist at Fayette and Indian Lake State Parks, MDOT Roadside Park on US-2 and Thompson Hatchery)**